N32H482xE/xG Product Brief

N32H482 series adopts a 32-bit ARM Cortex-M4F core, with a maximum operating frequency of 240MHz, supporting floating-point unit and DSP instructions. It integrates up to 512-KB embedded flash, 192-KB SRAM (including 32-KB CCM SRAM), and 4-KB Backup SRAM. It also integrates 4x 12bit 4.7Msps ADCs, 2x 12bit DAC, USB FS Device, USB HS DualRole, U(S)ART, I2C, SPI, CAN-FD, and other communication interfaces. It supports SDIO, FEMC, xSPI high-speed storage interfaces, I2S audio interface, multiple advanced control timers, general timers, basic timers, low-power timers. It also features a built-in hardware acceleration engine for cryptographic algorithms, supporting AES/TDES, SHA, SM3, SM4, MD5 algorithms, TRNG true random number generator, and CRC16/32.

Key features

- **CPU Core**
  - 32-bit ARM Cortex-M4F + FPU, single-cycle hardware multiplication and division instruction, support DSP instruction and MPU
  - Built-in 8-KB instruction Cache supporting Flash acceleration unit for zero-wait program execution
  - Frequency up to 240 MHz, 300 DMIPS
- **Memories**
  - 512-KByte of embedded Flash memory with ECC
    - Supports encryption, multi-user partition and data protection
    - 10,000 erase/write cycles and 10-years data retention
  - 512-KByte sFlash memory(only for N32H482VGL7), Supports 100,000 erase/write cycles and 20-years data retention
  - 160-KByte of general SRAM with hardware parity checking
  - 32-KByte of CCM SRAM with ECC, defaults to general SRAM after power-up, configurable as CCM SRAM
  - 4-KByte of Backup SRAM with ECC available in Standby mode
- **Power Modes**
  - Run mode: 45 mA/MHz@240 MHz (peripherals off, 3.3 V@25℃)
  - Stop0 mode: SRAM and all registers can be configured to retention, RTC run
  - Standby mode: 6uA, all backup registers and Backup SRAM retained, all IOs retained, optional RTC run
  - VBAT mode: 4uA, all backup registers and Backup SRAM retained, optional RTC run
- **Clock**
  - HSE: 4MHz~32MHz high-speed external crystal oscillator

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

- LSE: 32.768KHz low-speed external crystal oscillator
- Built-in multiple high speed PLLs
- MCO: Supports 2-channel clock outputs, which can be configured independently as clock output
- HSI: High-speed internal RC 8MHz, -1.5% to +2% accuracy (full temperature range)
- LSI: Low-speed internal RC 32KHz, +/-10% accuracy (full temperature range)

- **Reset**
  - Supports power-on/brown-out/external pin reset
  - Supports watchdog reset
  - Supports programmable voltage detection
- **GPIOs**
  - Up to 118 GPIOs
- **Communication Interfaces**
  - 1x USB2.0 FS Device interface, built-in PHY, supports crystal-less mode
  - 6x SPI interfaces, 2x I2S interfaces, support half/full duplex mode, multiplexed with SPI interfaces
  - U(S)ART interfaces
    - 4x USART interfaces (support ISO7816, IrDA, LIN)
    - 4x UART interfaces
    - TX/RX of USART3/UART5/UART8 can be mapped to all pins
  - 4x I2C interfaces(Master/Slave) with speed up to 1 MHz where slave mode support dual address response
  - 2x CAN-FD bus interface, TX/RX can be mapped to all pins
- **High Performance Analog Interfaces**
  - 4x 12bit ADCs with 4.7Msps
    - Multiple precision configuration, support 12-bit, 10-bit, 8-bit, 6-bit sampling precision, resolution up to 16-bit with hardware oversample
    - Up to 16 external single-ended input channels, 3 internal single-ended input channels, support differential mode and single-ended mode
  - 2x 12bit DAC with 1Msps sampling rate
    - Each DAC support 1 internal output channel and 1 external output channel
    - Support output channel buffered/unbeffered modes, supports internal output, external output, and simultaneous internal and external output.
  - 1x temperature sensor
- **High Speed External Memory Interfaces**

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

- 1x xSPI interface, supporting external SRAM, PSRAM and Flash, supporting XIP
- 1x FEMC (Flexible External Memory Controller) interface, supporting external SRAM, PSRAM, NOR Flash and NAND Flash, 8/16-bit data bus width configurable
- 1x SDIO interface, support SD/SDIO/MMC format

- **Mathematical hardware accelerator CORDIC for motor control functions**
- **Built-in filter mathematical accelerator FMAC, supporting FIR, IIR filtering**
- **DMA Controllers**
  - 2x DMA controller
  - Each controller supports 8 channels
  - Channel source address and destination address can be configured arbitrarily
- **RTC real-time clock**
  - Supports leap-year calendar, alarm event, periodic wake up
  - Supports internal and external clock calibration
- **Timers**
  - 3x 16-bit advanced control timers with maximum control precision of 4.16 ns
    - Support input capture, complementary output, quadrature encoder input etc.
    - Each timer has 6 independent channels, 4 of which support 4 pairs of complementary PWM output.
  - 10x 16-bit general purpose timers (GTIM1~10)
    - GTIM1~7, with a maximum control precision of 5.56ns, each timer has up to 4 independent channels, each channel supports input capture, output comparison, PWM generation, and single-pulse mode output.
    - GTIM8~10, with a maximum control precision of 4.16ns, each timer has up to 4 independent channels, each channel supports input capture, output comparison, PWM generation, and single-pulse mode output, only channel 1 supports complementary output with dead time, supports break input.
  - 2x 32-bit basic timers
  - 2x 16-bit low-power timer, can operate in Stop0 and Standby mode.
  - 1x 24-bit SysTick timer.
  - 1x 14-bit Window Watchdog (WWDG)
  - 1x 12-bit Independent Watchdog (IWDG)
- **Programming Methods**
  - Support SWD/JTAG debugging interface.
  - Support UART and USB Bootloader
- **Security Features**
  - Flash encryption, multi-user partition management unit (SMPU)

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

- Supports write protection (WRP), multiple read protection (RDP) levels (L0/L1/L2)
- Built-in hardware acceleration engine for cryptographic algorithm
- Supports AES/TDES, SHA, SM3, SM4, and MD5 algorithms
- True random number generator(TRNG)
- CRC16/32 operation
- Supports secure boot, program encryption download, secure firmware update
- Supports external clock failure detection, anti-tamper detection.

- **96-bit UID and 128-bit UCID**
- **Operating Conditions**
  - Operating voltage range: 1.8V~3.6V
  - Operating temperature range: -40℃ ~ 105℃
  - ESD: ±4KV (HBM model), ±1KV (CDM model)
  - EFT: VDD (+/-4KV，level A)，I/O (+/-2KV，level A)
- **Packages**
  - LQFP64(10mm ×10mm)
  - LQFP100(14mm ×14mm)
  - LQFP144(20mm ×20mm)
- **Ordering Information**

Reference	Part Number
N32H482xE	N32H482REL7, N32H482VEL7, N32H482ZEL7, N32H482VGL7

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

1 Ordering Information

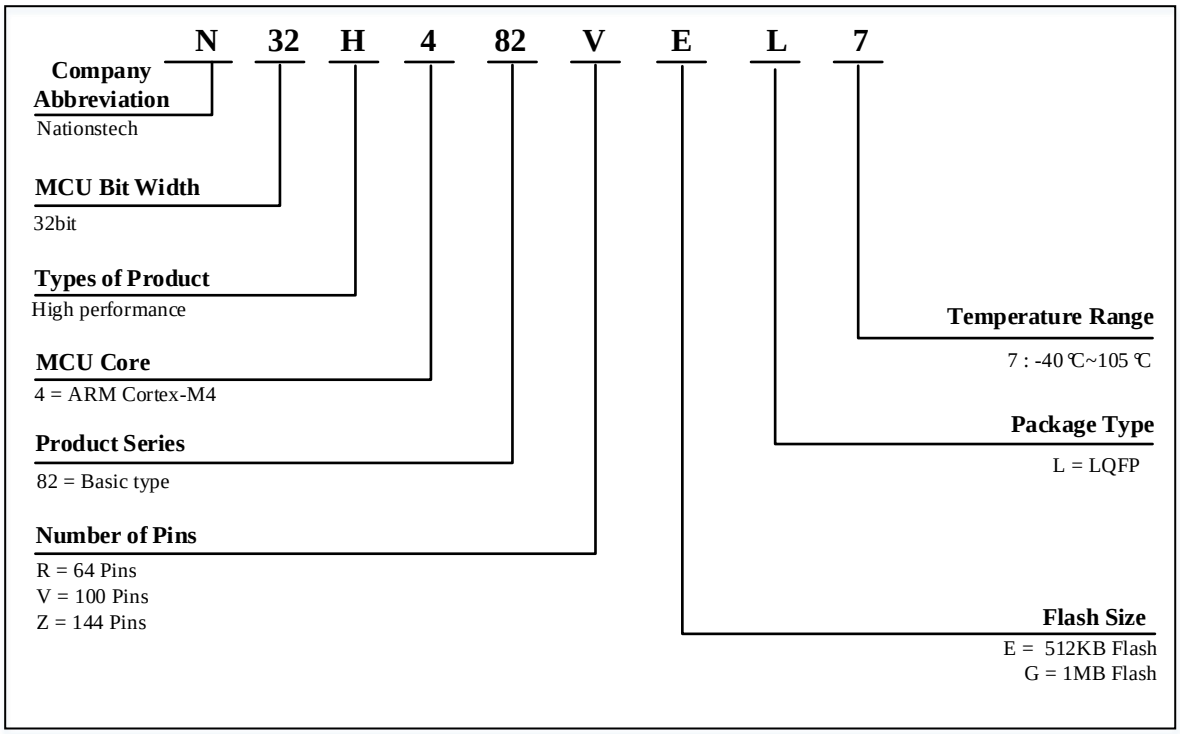


Table 1-1 N32H482 Series Ordering Code

Ordering Code(1)	Package	Size	Packaging(2)	SPQ(3)	Temperature range
N32H482REL7	LQFP64	10mm x 10mm	Tray	160	-40℃～105℃
N32H482VEL7	LQFP100	14mm x 14mm	Tray	90	-40℃～105℃
N32H482VGL7	LQFP100	14mm x 14mm	Tray	90	-40℃～105℃
N32H482ZEL7	LQFP144	20mm x 20mm	Tray	60	-40℃～105℃

1. For the latest detailed-ordering information, please refer to the Selection Guide.
2. The packaging provided is the basic packaging. If user has any other requirements, please contact Naitons.
3. Minimum packaging quantity.

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

2 Product Configurations

Table 2-1 N32H482 Series Product Configuration

Device		N32H482REL7	N32H482VEL7	N32H482VGL7	N32H482ZEL7
Operating Condition		1.8~3.6V/-40~105℃			
CPU Frequency		ARM Cortex-M4F @240MHz, 300DMIPS			
eFlash Capacity (KB) (2)		512	512	512	512
sFlash Capacity (KB) (3)		--	--	512	--
Total SRAM (KB)	General SRAM	160			
	CCM SRAM(1)	32			
	Backup SRAM	4			
Timers	ATIM	3*16bit			
	GTIM	7*16bit			
		3*16bit(4)			
	BTIM	2*32bit			
	LPTIM	2*16bit			
	SysTick timer	1			
	WWDG	1*14bit			
	IWDG	1*12bit			
	RTC	Yes			
Communication Interface	SPI/I2S	5/2	6/2		
	I2C	4			
	USART	4			
	UART	4			
	USB FS Device	Yes			
	USB HS DualRole	Yes			
	FDCAN	2			
Memory Expansion	XSPI	Yes			
	FEMC	No	Yes(5)		Yes
	SDIO	Yes			
GPIO WKUP Pins		54 4	85 5		118 5
DMA Number of channels		2 16Channel			
12bit ADC Number of channels		4 26Channel	4 42Channel		4 51Channel
12bit DAC Number of channels		2 2 External			
Algorithm Support		DES/3DES、AES、 SHA1/SHA224/SHA256、SM3、SM4、MD5、CRC16/CRC32			

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

TRNG	Yes		
Cordic	Yes		
FMAC	Yes		
Security Protection	Read-write protection (RDP/WRP), storage encryption, partition protection, secure boot		
Package	LQFP64	LQFP100	LQFP144

Notes:

(1) CCM SRAM is powered up as general SRAM by default, and users can configure it as CCM SRAM.

(2) eFlash: embedded Flash

(3) sFLASH: SIP Flash, XSPI interface closed, only supported by N32H482VGL7. sFLASH is connected to MCU as follows:

a) CS# of sFLASH connects to PF0(XSPI_NSS1) of MCU;

b) CLK of sFLASH connects to PG13(XSPI_CLK) of MCU;

c) DI/IO0 of sFLASH connects to PF2(XSPI_IO0) of MCU;

d) DO/IO1 of sFLASH connects to PF3(XSPI_IO1) of MCU;

e) WP# of sFLASH connects to PF4 of MCU, HOLD# of sFLASH connects to PF5 of MCU.

(4) Supports break input, Channel 1 supports complementary channel output.

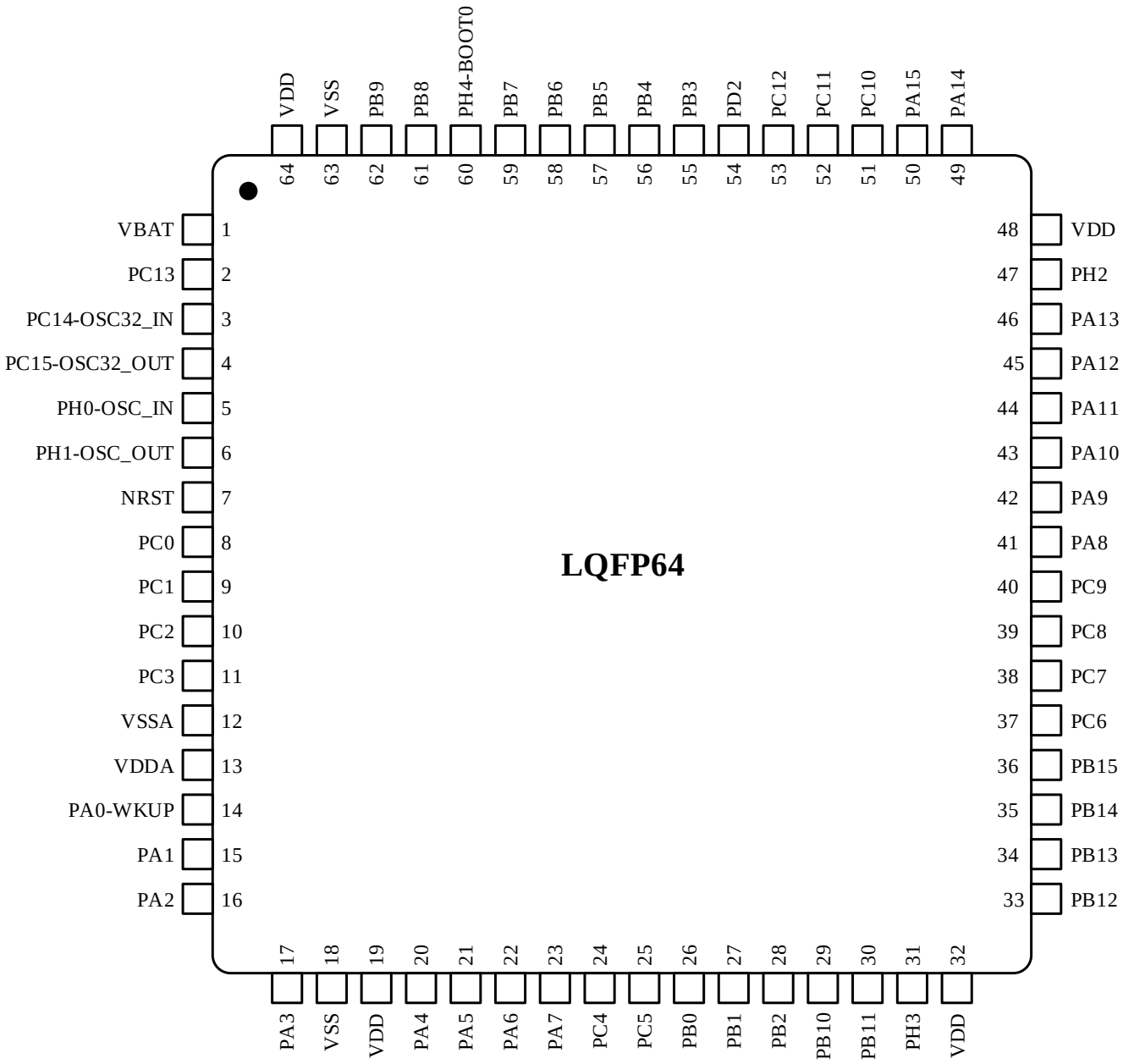
(5) Only supports address bus and data bus multiplexing.

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

3 Package

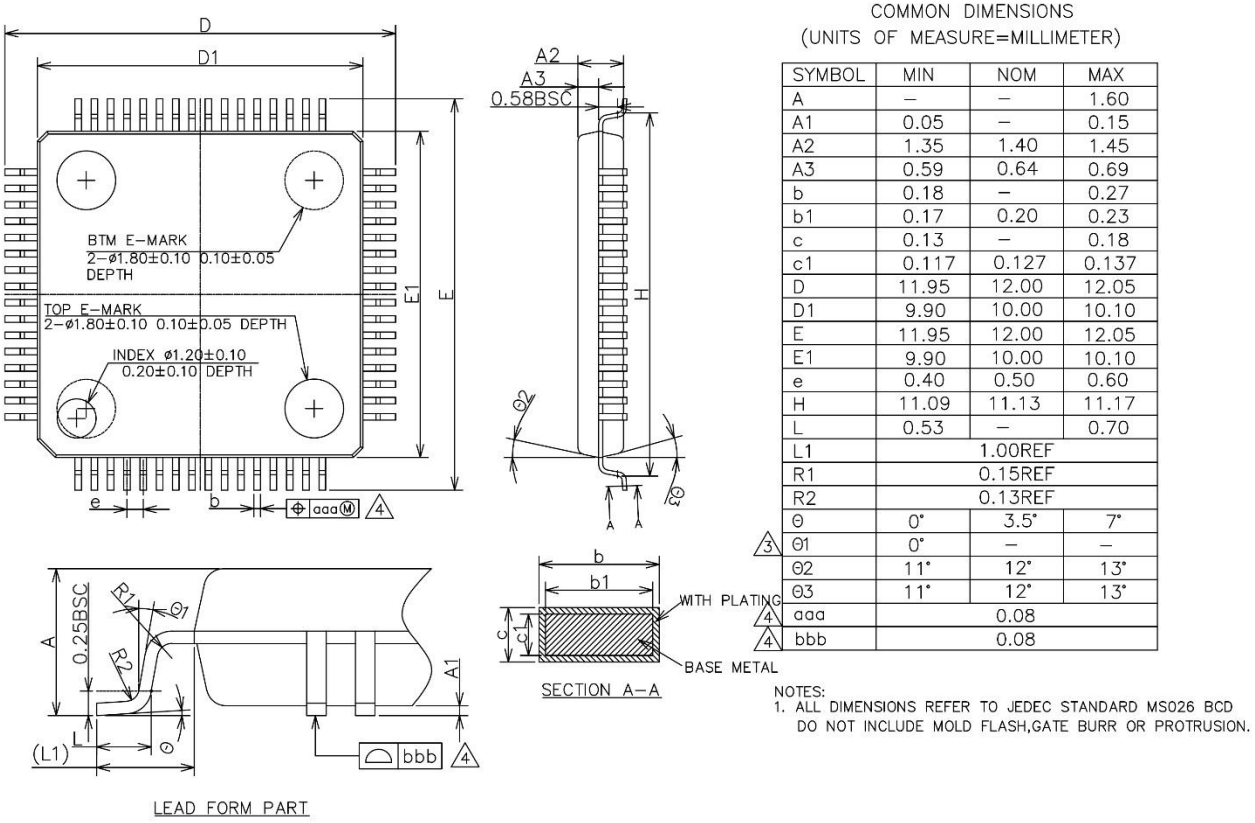
3.1 LQFP64

3.1.1 LQFP64 Pinout



NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

3.1.2 LQFP64 Package



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

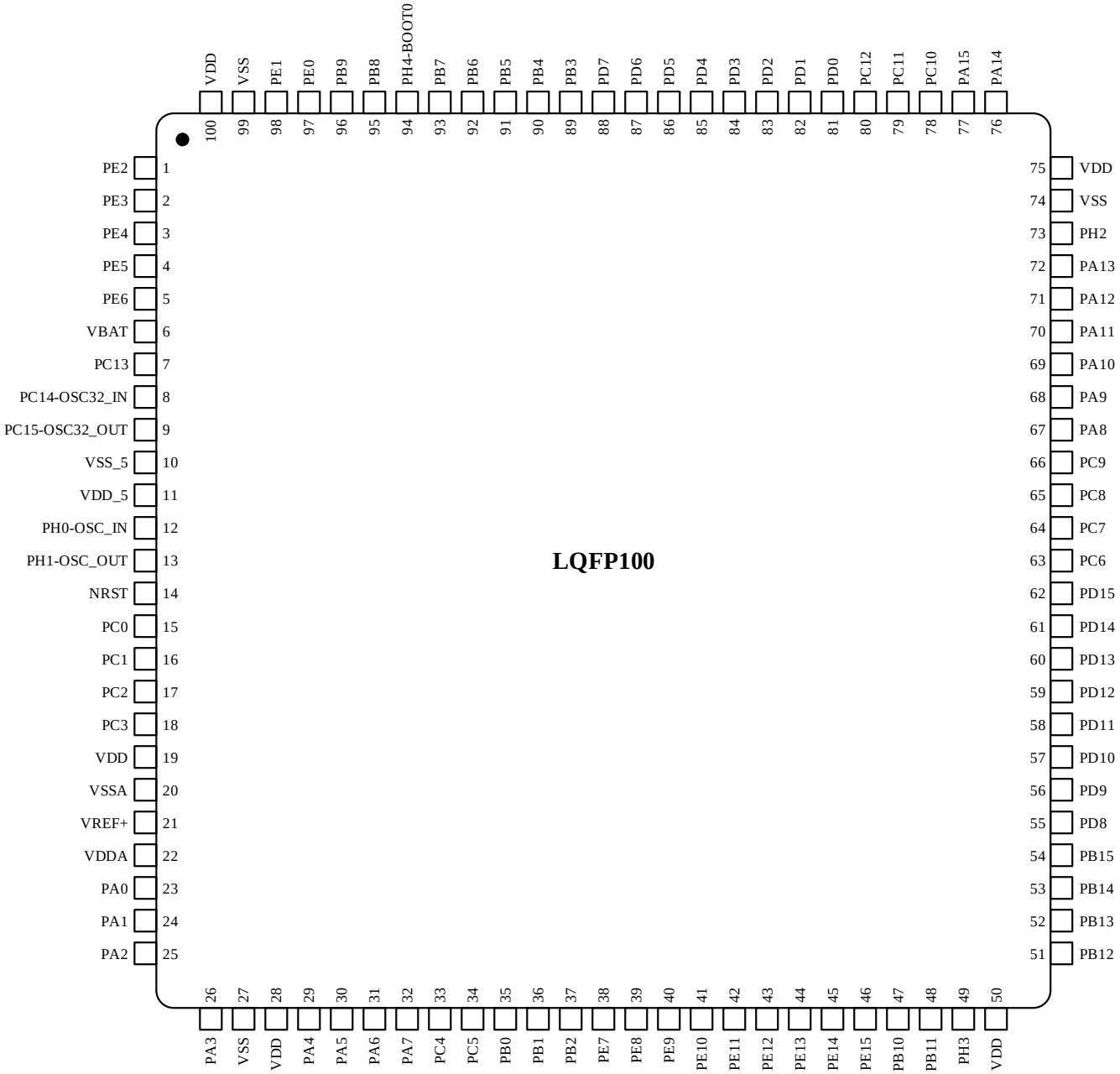
SYMBOL	MIN	NOM	MAX
A	–	–	1.60
A1	0.05	–	0.15
A2	1.35	1.40	1.45
A3	0.59	0.64	0.69
b	0.18	–	0.27
b1	0.17	0.20	0.23
c	0.13	–	0.18
c1	0.117	0.127	0.137
D	11.95	12.00	12.05
D1	9.90	10.00	10.10
E	11.95	12.00	12.05
E1	9.90	10.00	10.10
e	0.40	0.50	0.60
H	11.09	11.13	11.17
L	0.53	–	0.70
L1	1.00REF		
R1	0.15REF		
R2	0.13REF		
θ	0°	3.5°	7°
3 θ1	0°	–	–
θ2	11°	12°	13°
θ3	11°	12°	13°
4 aaa	0.08		
4 bbb	0.08		

NOTES:
1. ALL DIMENSIONS REFER TO JEDEC STANDARD MS026 BCD
DO NOT INCLUDE MOLD FLASH,GATE BURR OR PROTRUSION.

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

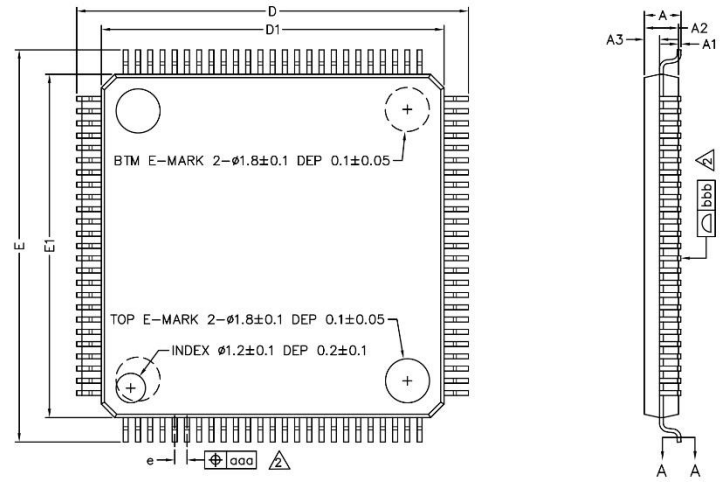
3.2 LQFP100

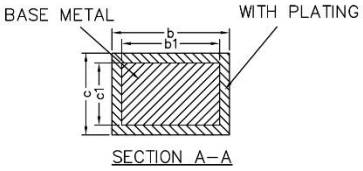
3.2.1 LQFP100 Pinout

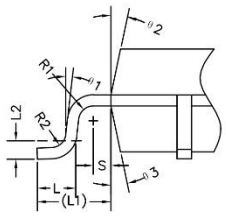


NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

3.2.2 LQFP100 Package







COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

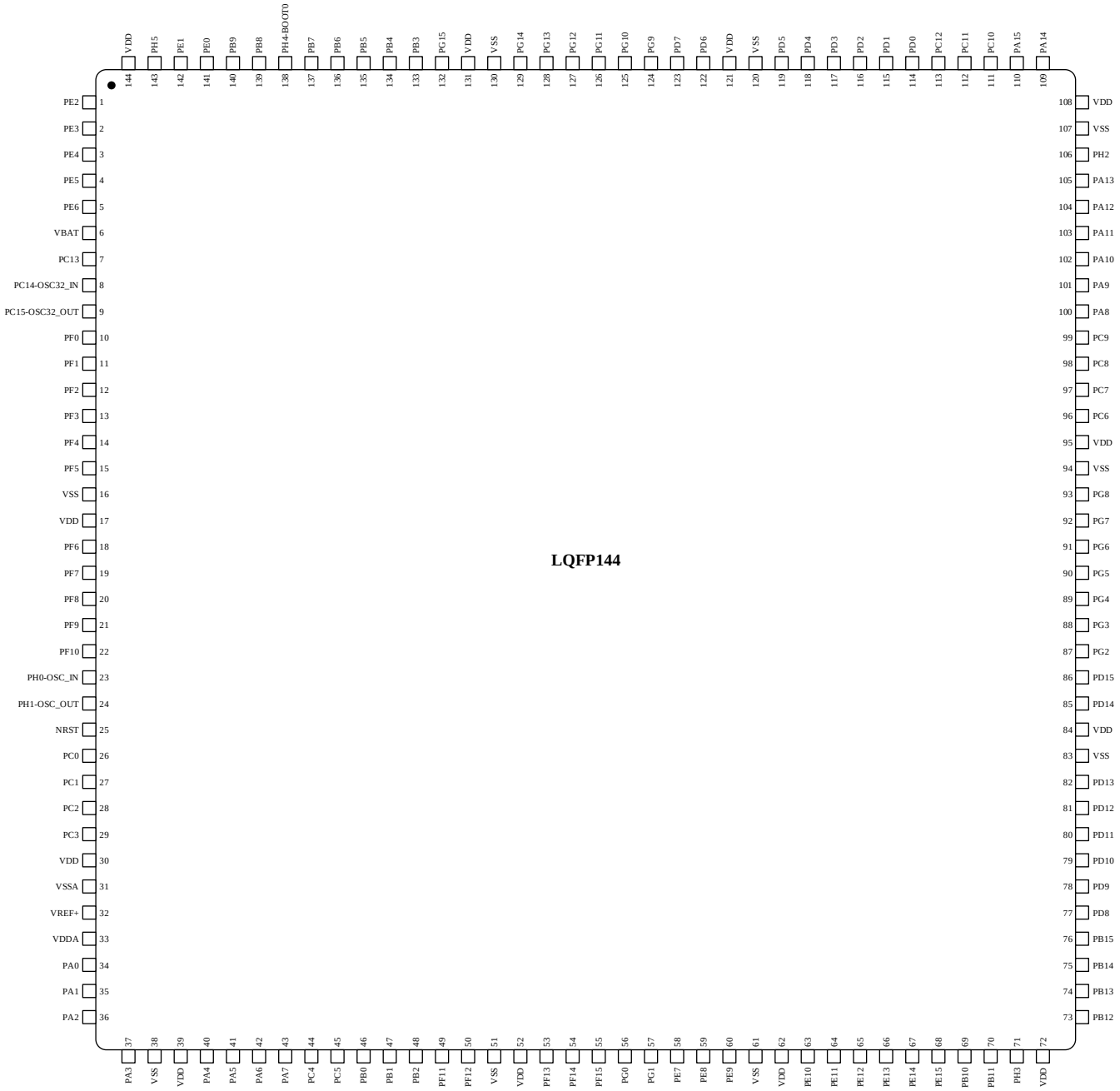
SYMBOL	MIN	NOM	MAX
A	–	–	1.60
A1	0.05	–	0.15
A2	1.35	1.40	1.45
A3	0.59	0.64	0.69
b	0.17	–	0.27
b1	0.17	0.20	0.23
c	0.13	–	0.18
c1	0.12	0.127	0.134
D	15.80	16.00	16.20
D1	13.90	14.00	14.10
E	15.80	16.00	16.20
E1	13.90	14.00	14.10
3 e		0.50BSC	
L	0.45	0.60	0.75
L1		1.00REF	
L2		0.25BSC	
R1	0.08	–	–
R2	0.08	–	0.20
S	0.20	–	–
θ	0°	3.5°	7°
θ 1	0°	–	–
θ 2	11°	12°	13°
θ 3	11°	12°	13°
2 aaa		0.08	
2 bbb		0.08	

NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD MS-026 BED DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

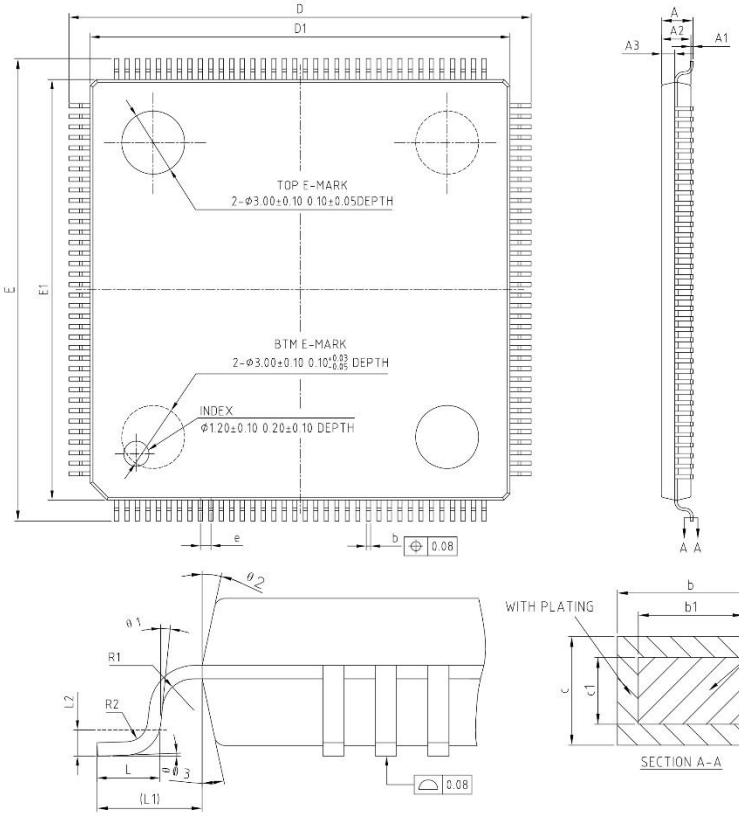
3.3 LQFP144

3.3.1 LQFP144 Pinout



NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

3.3.2 LQFP144 Package



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	–	–	1.60
A1	0.05	–	0.15
A2	1.35	1.40	1.45
A3	0.59	0.64	0.69
b	0.17	–	0.27
b1	0.17	0.20	0.23
c	0.127	–	0.18
c1	0.119	0.127	0.135
D	21.80	22.00	22.20
D1	19.90	20.00	20.10
E	21.80	22.00	22.20
E1	19.90	20.00	20.10
e	0.40	0.50	0.60
L	0.45	0.60	0.75
L1		1.00REF	
L2		0.25BSC	
R1	0.08	–	–
R2	0.08	–	–
θ	0°	–	7°
θ1	0°	–	–
θ2	11°	12°	13°
θ3	11°	12°	13°

NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD MS-026 BFB DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

4 Version History

Version	Date	Changes
V1.0.0	2024.11.12	Initial release.
V1.1.0	2025.5.9	1. Add N32H482VGL7 model number

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg

5 Disclaimer

This document is the exclusive property of NSING TECHNOLOGIES PTE. LTD. (Hereinafter referred to as NSING). This document, and the product of NSING described herein (Hereinafter referred to as the Product) are owned by NSING under the laws and treaties of Republic of Singapore and other applicable jurisdictions worldwide. The intellectual properties of the product belong to NSING Technologies Inc. and NSING Technologies Inc. does not grant any third party any license under its patents, copyrights, trademarks, or other intellectual property rights. Names and brands of third party may be mentioned or referred thereto (if any) for identification purposes only. NSING reserves the right to make changes, corrections. enhancements, modifications, and improvements to this document at any time without notice. Please contact NSING and obtain the latest version of this document before placing orders. Although NSING has attempted to provide accurate and reliable information, NSING assumes no responsibility for the accuracy and reliability of this document. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. In no event shall NSING be liable for any direct, indirect, incidental, special, exemplary, or consequential damages arising in any way out of the use of this document or the Product. NSING Products are neither intended nor warranted for usage in systems or equipment, any malfunction or failure of which may cause loss of human life, bodily injury or severe property damage. Such applications are deemed, Insecure Usage'. Insecure usage includes, but is not limited to: equipment for surgical implementation, atomic energy control instruments, airplane or spaceship instruments, all types of safety devices, and other applications intended to supporter sustain life. All Insecure Usage shall be made at user's risk. User shall indemnify NSING and hold NSING harmless from and against all claims, costs, damages, and other liabilities, arising from or related to any customer's Insecure Usage Any express or implied warranty with regard to this document or the Product, including, but not limited to. The warranties of merchantability, fitness for a particular purpose and non-infringement are disclaimed to the fullest extent permitted by law. Unless otherwise explicitly permitted by NSING, anyone may not use, duplicate, modify, transcribe or otherwise distribute this document for any purposes, in whole or in part.

NSING Technologies Pte. Ltd.
Address: 20 Science Park, #03-15/16
Teleteck Park, East Wing, Singapore 117674
Email: sales@nsing.com.sg